BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 11-403
1 DECEMBER 1996

Flying Operations

★*AEROSPACE PHYSIOLOGICAL TRAINING PROGRAM*

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

This instruction implements AFPD 11-4, Aviation Service. It governs the Air Force Aerospace Physiological Training Program. The program teaches the physiological stresses and human factor implications of modern military aviation and prepares the flyer to meet these challenges. The goal of this program is to enhance flight safety by helping to reduce the number of human factor mishaps. It applies to active duty Air Force, Air Force Reserve, and Air National Guard personnel on flying status, passengers in certain types of aircraft, and personnel who manage physiological training and research chamber activities. It implements NATO STANAG 3114, Aeromedical Training of Flight Personnel; and NATO STANAG 3474, Temporary Flying Restrictions Due to Exogenous Factors Affecting Aircrew Efficiency. Send recommendations for changes on AF Form 847, **Recommendation for Change Publication,** to HQ AFMOA/SGOO, 110 Luke Avenue, Room 400, Bolling AFB DC 20332-7050. Attachment 1 is a glossary of references, abbreviations, acronyms, and terms.

The Privacy Act of 1974 affects this instruction. The authority of 10 U.S.C. 133 and 8013 allows the collection and maintenance of this information. Forms required by this instruction and affected by the Privacy Act have appropriate Privacy Act Statements. Privacy Act System of Records Notice F161 AF SG A, Air Force Aerospace Physiology Training Programs, applies. The use of a name of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF REVISIONS

This revision outlines the duties of the Air Force Career Field Manager for the 4M0X1 AFSC; the duties of the MAJCOM Functional Manager; lists the foreign countries whose aerospace physiology training is acceptable for flying in USAF aircraft; outlines reporting procedures for civilian distinguished visitor trainees; broadens the academic degree requirement to include other life sciences associate degrees for physiology technicians to be certified to teach subjects listed in paragraph 6.1.1; outlines exceptions to Original Instruction requirements for Joint Specialized Undergraduate Flying Training students; adds chamber training exemption for aircrew completing bleomycin chemotherapy; authorizes the use of a Type 1 chamber flight in lieu of a Type 3 chamber flight for Operational Support Instruction; adds demonstration of the proper hypoxia recovery technique as a requirement for all Original, High Altitude Parachutist, and Operational Support students; changes scheduling requirements and medical form requirements for ROTC cadets requesting training; makes AF Form 701, **Chamber Flight Record** obsolete; adds Chapter 12, Course Standardization and Evaluation Program.

Paragraph

Supersedes: AFI 11-403, 19 July 1994.
OPR: HQ AFMOA/SGOO (Lt Col Jeffrey C. Sventek)
Certified by: HQ AFMOA/SGOA (Lt Col Mark Ediger)
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Chapter 1

RESPONSIBILITIES ASSIGNED

1.1. Surgeon General. HQ USAF/SG provides medical, technical, fiscal, and administrative supervision needed to carry out the Aerospace Physiological Training Program.

1.1.1 The Objectives of the USAF Aerospace Physiology Program are:

1.1.1.1. To develop and conduct physiological and human factors training that meets the needs of USAF crewmembers.

1.1.1.2. To support Team Aerospace in developing and delivering physiological/human factors threat briefings specific to the crewmember's deployed environment.

1.1.1.3. To develop the human factors expertise to support aircraft mishap investigation

1.1.1.4. To develop and field human factors support for the flight safety community

1.1.1.5. To assist Team Aerospace in the safe and effective deployment and employment of aircrews

1.1.1.6. To support special needs of the aircrews and their customers

1.1.2. The USAF Surgeon General approves the appointment of a senior NCO to perform additional duties as the Air Force Career Field Manager (AFCFM) for the 4M0X1 Air Force Specialty. The AFCFM acts as the communication link between the Air Force Surgeon General's office and the enlisted personnel in the Aerospace Physiology career field. The AFCFM:

1.1.2.1. Develops and maintains the currency of the Career Field Education and Training Plan (CFETP).

1.1.2.2. Assists the technical training manager and course personnel with planning, developing, implementing, and maintaining all AFSC-specific training courses.

1.1.2.3. Acts as final waiver authority for enlisted training/classification requirements.

1.1.2.4. Assists the Air Force Occupational Measurement Squadron (AFOMS) in identifying subject matter experts (SMEs) for Specialty Knowledge Test (SKT) revision projects and acts as consultant on promotion test content and question validation inquiries.

1.1.2.5. Assists AFOMS in developing and administering Job Inventory Surveys and interpreting Occupational Survey Reports (OSR) data.

1.1.2.6. Develops, coordinates, and implements career field classification/structure changes.

1.2. Major Command. MAJCOM headquarters should support the regulatory, technical, and resource needs of the following (note that programs within line organizations may be funded through line channels):

- USAF Aerospace Physiology Programs
- MAJCOM Aerospace Physiology Program
- MAJCOM Aerospace Physiology Personnel
- MAJCOM Aerospace Physiology Facilities and Equipment
- MAJCOM High Altitude Airdrop Mission Support Program
- MAJCOM Centrifuge and Pressure Suit Operations

1.2.1 MAJCOM personnel conduct the training courses outlined in chapter 6. MAJCOMs should broaden and modify each course to meet specific command and weapon system requirements. HQ AFMOA/SGOO is the approval authority for all modifications. After receiving approval, MAJCOM personnel must include the modifications in their supplements to this instruction.

1.2.2. The command surgeon gives medical, technical, fiscal, and administrative supervision and support required to carry out the program.

1.2.3. The US Air Force considers MAJCOM aerospace physiology training flights (APTF) and physiological support squadrons (PSPTS) as geographical area training facilities. They provide the training support, addressed by this instruction, to all US Air Force flying organizations in the geographical area, irrespective of MAJCOM affiliation, and to all Air National Guard and Air Force Reserve organizations. They also provide training support to DoD organizations and other Federal employees.

1.2.4. The command surgeon of each MAJCOM with one or more aerospace physiology training or support functions designates a command coordinator. A fully qualified aerospace physiologist, Air Force specialty code (AFSC) 43A4, M11XXX, or M12XXX holds this position. The command coordinator:

1.2.4.1. Functions as the command focal point, and the command surgeon's staff representative for aerospace physiology and aviation human factors.

1.2.4.2. Conducts command-wide management, inspection and coordination of aerospace physiology resources.

1.2.4.3. Monitors medical aspects of the US Air Force Life Support Program.

1.2.4.4. Provides High Altitude Airdrop Mission Support (HAAMS) to meet demands of theater commander.

1.2.4.5. Monitors and reviews physiological training conducted by other US or allied military agencies for US Air Force aircrew.
1.2.4.6. Designates a MAJCOM Functional Manager (4M0X1) to assist in accomplishing the duties and responsibilities of the command coordinator.
1.2.4.7. Provides consultant services for physiological and human factor investigation and analysis of military aircraft mishaps.
1.2.5. All physiologists assigned to mishap boards should be graduates of the Air Force Aircraft Mishap Investigation Course, (WCIP05A), Kirtland AFB, New Mexico, or the Aircraft Mishap Investigation and Prevention Course (B30ZY43A3 002), Brooks AFB, Texas.
1.2.6. The MAJCOM Functional Manager (MFM) will provide guidance on 4M0X1 assignments, when requested by HQ AFPC; will coordinate formal training schools with the appropriate agencies.
1.2.6.1. The MFMs:
1.2.6.1.1. Assist their MAJCOM Coordinator in accomplishing special projects and disseminating command policy on Aerospace Physiology matters.
1.2.6.1.2. Manage their MAJCOM enlisted career development, including intracommand enlisted assignments and career field education and training.
1.2.6.1.3. Provide MAJCOM support for all Utilization & Training Workshops (U&TW).
1.2.6.1.4. Assist the AFCFM in developing the CFETP and the Career Development Courses (5-level and 7-level).
1.2.6.1.5. Assist the AFCFM on taskings from AFMOA and career field enlisted issues by providing research data and supporting documents when necessary.
1.2.6.1.6. Provide inputs to the strategic planning process for the aerospace physiology training program.

1.3. Medical Unit Commander. Provides medical, fiscal, and administrative supervision and support required at base level.

1.4. Chief, Aerospace Physiology Training Flight:
1.4.1. Manages the training and support function.
1.4.2. Supports the local wing with appropriate aerospace physiology and human performance enhancement training. Supports regional aircrews with aerospace physiology and human performance enhancement training. Manage active and safe participation of unit aerospace physiology personnel in flying operations.
1.4.3. Works as an integrated team with local flight safety and flight medicine in addressing local training needs.
1.4.4. Ensures that unit personnel participate regularly in wing and squadron flying safety meetings. Insure all briefings are properly coordinated with the host Flight Safety Office and Flight Medicine Office.
1.4.5. Provides consultant services for physiological and human factor investigation and analysis of military aircraft mishaps upon request from the MAJCOM.
1.4.6. Provides HAAMS when tasked by the ACC Command Coordinator according to appropriate regulations, directives and support agreements and budgets annually for HAAMS TDYs based on previous years' missions.
1.4.7. Supports research in aerospace physiology and life support equipment.

1.5. HAAMS Program Responsibility. The ACC Command Coordinator is responsible for the HAAMS Program and designates 1 AMDS/SGPT Langley AFB, VA 23665-2080 (DSN 574-7827/3913) as the tasking agency for all HAAMS operations except PACAF. PACAF HAAMS operations are tasked by 18 AMDS/SGPT Kadena AB, JA (DSN 315-634-1967). HAAMS operations are considered any Joint Airborne/Air Transportability Training (JA/ATT) mission, Special Assignment Airlift Missions (SAAM), or other flight operation that involves the use of Aerospace Physiology Technicians (PTs) or Aerospace Physiologists to support unpressurized aircraft flight, to include High Altitude Low Opening (HALO)/High Altitude High Opening (HAHO) personnel and equipment drops, equipment testing and research, and Psychological Operations (PsyOps).

1.6. Superintendent, Aerospace Physiology. The Manager, Superintendent or Noncommissioned Officer in Charge (NCOIC) of Aerospace Physiology:
1.6.1. Manages the unit enlisted force and serves as resource manager for assigned personnel.
1.6.2. Identifies and requests formal and informal training courses needed to qualify enlisted personnel to meet mission tasking.
1.6.3. Requests depot maintenance through the MAJCOM.
1.6.4. Establishes close liaison with the wing life support office and ensures unit personnel are familiar with MAJCOM life support policies.
1.6.5. Coordinates training for unit personnel in areas of life support, personal equipment, aircraft escape, and survival training for assigned wing aircraft.

1.6.6. Ensures an effective instructor and technician in-service training program is established and monitored.
1.6.7. Maintains repository for lesson plan background information.
1.6.8. Maintains standardized lesson plans for enlisted instructors.
1.6.9. Ensures ongoing development of realistic training for aircrews.
1.6.10. Develops, implements, and documents a plan to ensure familiarity of aerospace physiology technicians with the flying environment.
1.6.11. Ensures recurrent review of aerospace physiology technicians' role in training aircrews and non-flying warfighters.

Chapter 2

TRAINING REQUIREMENTS

2.1. Personnel Who Are or Will Be Placed on Active Flying Status:
2.1.1. Original Training. The following people must complete this training:
2.1.1.1. Pilot and navigator trainees in undergraduate flying training (UFT).
2.1.1.2. Pilot trainees in Euro-NATO Joint Jet Training and Undergraduate Pilot Training-Helicopter, before they start the flying phase of training.
2.1.1.3. Nonrated aircrew members assigned Aviation Service Code 9D (Active-Nonrated Aircrew Member), e.g., flight engineers, loadmasters, boom operators, aeromedical technicians on flying status, gunner or sensor system operators, scanners and pararescue personnel, and flight photographers and test engineers flying in fighters. Parachutists assigned Aviation Service Code 9E who fly above 10,000 feet MSL.
2.1.1.4. Nonrated Aircrew members assigned Aviation Service Code 9W (Active Weapons Controllers)
2.1.1.5. Flight surgeons, flight nurses, aerospace physiologists, aeromedical evacuation technicians and aerospace physiology technicians get original training according to the training syllabus at the US Air Force School of Aerospace Medicine.
2.1.2. Operational Support Training. Nonrated assigned Aviation Service Code 9C (Active-Operational Support (Non-Crewmember)). This includes personnel not listed in 2.1.1 above. Operational support personnel include, but are not limited to: flight attendants, flight photographers, test engineers, observers, flying crew chiefs, and Airborne Command Post and Airborne Warning and Control crew stationed aft of the flight deck. MAJCOMs will make final determination which course a person will require if not clear from the examples in this instruction.
2.1.3. Refresher Training. All flying personnel must receive refresher training once every 3 years, unless they are exempted by this instruction or by AFI 11-401. The expiration date is the last day of the month in which training is required. For example, if the last training was conducted on 19 October 1995, the next training is due not later than 31 October 1998. Those who are delinquent in this training will not fly and could be subject to disqualification IAW AFI 11-401.
2.1.4. Exceptions to Training. Personnel who qualify as exceptions:
2.1.4.1. Officers with more than 25 years of rated service, who must fly with an instructor, receive refresher training academics every 5 years. However, all officers with over 25 years of rated service who, by current guidance, are permitted to fly without an instructor, receive refresher training academics every 3 years. Training in an altitude chamber is optional for all aircrew after 27 years of rated service, however the academic portion is still required. EXAMPLES: If training for an officer flying with an instructor becomes due at or after the 25 years of rated service point, the training frequency is 5 years. Refresher training at the 22 year and 1 month point of rated service will require refresher training at the 27 year and 1 month point. Since 27 years of rated service has elapsed, the altitude chamber portion of training is optional.
2.1.4.2. All aircrew entering the fighter inventory immediately following completion of UFT receive their first refresher training as required by the MAJCOM. Aircrew require subsequent refresher training every 3 years as specified in paragraph 2.1.3.
2.1.4.3. Rated personnel, transferred, in student status, or on exchange duty from the US Navy, US Coast Guard, US Marine Corps, or US Army, who have current aerospace physiology training in their service are not required to take US Air Force refresher training before their first flight in US Air Force aircraft unless they are to fly fighter-type aircraft. Those personnel flying fighter-type aircraft (which includes T-37 and T-38) can be qualified to fly with a 1- to 2-hour briefing by an Air Force Aerospace Physiologist on subjects in paragraph 6.1.2, paragraph 6.1.7, and paragraph 6.1.10.
2.1.4.4. Foreign flying personnel who have current aerospace physiology training from their country are not required to take US Air Force refresher training before their first flight in US Air Force aircraft if their country's aerospace physiology training program is unconditionally accepted. Aerospace physiology training is unconditionally accepted from the countries listed below. Aerospace Physiology Flights must verify training currency and publish an AF Form 702, **Individual Physiological Training Record,** indicating date of training and expiration. Foreign flying personnel from countries not listed below will participate in the appropriate USAF Aerospace Physiology Refresher course as directed by paragraph 2.1.3.

- Australia
- Canada
- Denmark
- Germany
- Greece
- Japan
- Jordan
- Korea
- Netherlands
- Norway
- Pakistan
- Philippines
- Portugal
- Saudi Arabia *
- Singapore
- Thailand
- United Kingdom

*** Saudi Arabian aircrews flying in ejection seat aircraft who are current in aerospace physiology need only a firing in an ejection seat trainer.**

2.1.4.5. Noncrew personnel, assigned to helicopter duties who do not fly above 10,000 feet mean sea level (MSL), do not have to receive original, operational support, or refresher training.

2.1.4.6. Physiology training is waived during pregnancy. Waiver must be applied for IAW AFI 48-123, Medical Examination and Standards, paragraph A6.22.

2.2. Passengers in Aircraft Flying Above 18,000 Feet Mean Sea Level. Personnel must complete:

2.2.1. Operational Support Training (OST) as described in chapter 6, before flying, unless exempted by a specific Memorandum of Understanding (MOU).

2.2.2. Refresher training every 3 years as described in chapter 6.

2.2.3. Personnel who qualify as exceptions are passengers who fly in E-3, E-4, E-8, KC-10, C/KC/RC/EC-135, EC-130, MC-130, AC-130, T-1, T-39, T-43, and C-designated aircraft.

2.3. Civilian Training:

2.3.1. Civilians authorized US Air Force physiological training must complete original, operational support or refresher training, as appropriate.

2.3.2. The local wing commander may authorize training for civilians when required for military orientation flights. The organizational commander must justify training for government employees and government-contractor employees.

2.3.3. HQ USAF/SGI, Congressional and Public Affairs, must be notified by letter or phone, DSN 297-5046, of all civilian Distinguished Visitors (DVs), before training is accomplished. The local base Public Affairs office should also be notified. Annotate all DV training on AF Forms 699, **Physiological Training Record** and AF Form 702, **Individual Physiological Training Record.** Include the DV's name, organization, and reason for the training in the monthly report.

2.3.4. Reserve Officer Training Corps (ROTC) and Civil Air Patrol (CAP) members are eligible to receive US Air Force physiological training when their organizational commanders authorize training with a letter of approval or by placing them on orders.

2.3.5. The minimum age for all nonmilitary trainees is 18. Comply with the state's age requirement, when more restrictive.

2.3.6. The Air Force authorizes all other civilians training under the US Air Force and Federal Aviation Administration (US Air Force and FAA) Agreement. It authorizes CAP members FAA training at no cost.

2.3.7. HQ AFMOA/ SGOO must approve support for civilian high altitude projects, special projects, the use or long-term loan of operational (versus broken or outdated) life support equipment, and personnel support.

2.4. Personnel Who Must Take Refresher Training Before Permanent Change of Station Departure. Training requirements before moving to a new assignment:

2.4.1. All flying personnel being assigned to an active flying assignment overseas for a tour of 36 months or less must complete training within 3 months of their departure dates, if currency will expire during their overseas tour. The training is valid for the entire 36-month tour. All personnel (including USAFE) must take refresher training within 3 months of their return to CONUS from overseas, if required. This 3-month period will begin on the first duty day in the new CONUS assignment.

2.4.2. Training is valid for 48 months for USAFE aircrews.
2.4.3. Maximum currency for physiological training under this requirement is 42 months from the date of last training; 48 months from the date of last training if assigned in USAFE.
2.4.4. Aircrew whose first operational assignment is to an overseas location are exempt from the requirement to complete training within 3 months before their departure date if their training pipeline en route exceeds 3 months.
2.4.5. Active flying personnel who will be assigned to overseas locations with a fully operational Aerospace Physiology Unit collocated (Barbers Point HI (Hickam AFB HI) and Kadena AB JA) will not be required to take refresher aircrew physiological training before PCS unless the due date occurs within 60 days of the departure date.

2.5. Requalification. Any person may be requalified in aerospace physiology training by taking a refresher course if they previously had original type training.

2.6. Waiver Requests. Requests for waivers to this instruction should be directed to **Chief, Aerospace Physiology, HQ AFMOA/SGOO, 110 Luke Avenue, Room 400, Bolling AFB, DC 20332-7050, DSN 297-1858, Commercial (202) 767-1858, FAX DSN 754-8089, FAX Commercial (202) 404-8089.**

Chapter 3

QUALIFICATIONS OF PHYSIOLOGICAL TRAINING PERSONNEL

3.1. Biomedical Sciences Corps and Rated Officers. Biomedical Sciences Corps (BSC) officers (AFSC 43AX), pilots (AFSC M11XXX), and navigators (AFSC M12XXX) assigned for duty with the Air Force aerospace physiology training program must be graduates of the Aerospace Physiology Officer Course. Rated Aerospace Physiologists assigned to active flying positions should maintain currency in aircraft for which they are qualified. Rated aerospace physiologists who fly will comply with all aircrew training and operational directives, to include crew rest, mission planning, preflight, flight time, postflight, maintenance and mission briefings.

3.2. Familiarization Flights. Aerospace physiology personnel should receive periodic familiarization flights in aircraft for which they provide training to enable these personnel to better tailor courses to local flying requirements.

3.3. Medical Examination and Medical Standards. All personnel must meet the flying physical requirements of AFI 48-123 (ASC 9C - Operational Support). They must take part in regular, frequent chamber flights as required. Individuals placed in a “duty not involving flying” (DNIF) status will be evaluated by the local flight surgeon to determine their fitness to perform outside chamber duties.

3.4. Platform Instructors. Officer or enlisted instructors giving formal classroom presentations must be graduates of an Air Force academic instructor course, technical instructor course, or academic instructor training conducted as a part of the AFSC awarding courses taught at the US Air Force School of Aerospace Medicine.
3.4.1. Physiological training personnel qualify as platform instructors by meeting MAJCOM and local Chief Aerospace Physiology requirements.
3.4.2. During and after initial qualification monitor physiological training instructors per MAJCOM direction.
3.4.3. Maintain a file on each individual assigned to hypobaric and/or hyperbaric duties. The file should contain, as a minimum, medical and instructor qualifications. For example: AF Form 1042, **Medical Recommendation for Flying or Special Operational Duty;** hazardous duty orders, if available, or a letter signed by the individual’s commander placing them on chamber duty; AF Form 1256, **Certificate of Training;** AF Form 702, **Individual Physiological Training Record;** DD Form 114, **Military Pay Order,** etc. Dispose of records according to Air Force directives.

3.5. Personnel not Directly Assigned to a Chamber Facility. Personnel qualified under chapter 3, who are not directly assigned to a chamber facility, may continue to maintain operational currency in aircrew human performance issues and in hypobaric or hyperbaric chamber operations by observing student classroom discussions and participating as an inside crew member during chamber operations when approved by MAJCOM Coordinator and HQ AFMOA/SGOO. Research personnel who routinely work with aircrew should observe student classroom discussions at least annually. This requirement applies to individuals who meet the following conditions:
3.5.1. Medically qualified for such duty.
3.5.2. Located close to a US Air Force chamber activity (no temporary duty (TDY) required).

3.5.3. TDY permitted if determined by the local commander to be required to maximize job performance.
3.5.4. Involved in the management, evaluation, formulation, or teaching of physiology and aerospace physiological training, related research and development, or test and evaluation programs.
3.5.5 Likely to return to direct support of aerospace physiology training or related research programs.

3.6. Personnel Attachment and Chamber Duties. Personnel not directly assigned to a research or training chamber activity will be attached according to MAJCOM needs to a local research, physiological training or physiological support unit by MAJCOM Coordinator with HQ AFMOA/SGOO approval. Attached personnel are restricted from participating as inside observers during chamber operations. If a chamber unit requires attached personnel to perform inside observer duties during chamber operations, inidivual requests for approval will be considered. Individual requests must be initiated, in writing, by the host unit chief to their MAJCOM Coordinator for approval. Requests must fully justify reasons for using attached personnel (manning shortage, increased training load, etc.) and must state a specific period of time the attached person is needed. If approved by MAJCOM Coordinator, the request must be forwarded to HQ AFMOA/SGOO for final approval. Attached personnel will also respond to the other needs of the host unit and must provide services as outlined by HQ AFMOA/SGOO and as required by the local APTF chief, PSPTS commander, or research director. These services may include:
3.6.1. Consultation to the unit staff.
3.6.2. Pre- and post-chamber flight briefings.
3.6.3. Hyperbaric chamber support, when qualified.
3.6.4. Review of instructions, new techniques, and procedures.
3.6.5. Classroom training when required.
3.6.6. Support activities provided by these attached personnel must be reported on AF Form 700, **Physiological Training Monthly Report,** RCS: HAF-SGP(M)7137, by the unit of attachment.

3.7. Aerospace Physiology Personnel Training Requirements:
3.7.1. All aerospace physiologists and aerospace physiology technicians will maintain refresher training currency in aerospace physiology.
3.7.2. All aerospace physiology personnel are highly encouraged to attend at least two of the following Air Force formal schools:

- Airborne (Parachutist) - J5ZAZ1T231-001.
- HALO Jump Course - J5AZA11000-003.
- Combat Survival - S-V80A.
- Arctic Survival - S-V87A.
- Water Survival - S-V86A.

3.7.3. Aerospace physiology flights (APTF) performing a flying and or jump mission (EXAMPLE: HAAMS, Parasail Training and test jumps) must project needed quotas to Airborne (Parachutist), Combat Survival and Water Survival courses annually. Flights supporting HAAMS should schedule their parachute qualified personnel to attend the HALO Jump Course. Unit personnel may attend as they become qualified when quotas are received.
3.7.4. In addition to the courses listed above, aerospace physiologists assigned to an APTF or PSPTS should attend either the Aircraft Mishap Investigation Course (WCIP05A), or the Aircraft Mishap Investigation and Prevention Course (B30ZY43A3 002), and the Aviation Human Performance Course (WCIP07K).

Chapter 4

LIMITATIONS ON INSIDE INSTRUCTORS-OBSERVERS

4.1. Maximum Exposures for Inside Instructors-Observers. Exposure limits for personnel inside low-pressure chambers:
4.1.1. Four flights in a 7-day period to or above 25,000 feet.
4.1.2. Three flights in a 7-day period to or above 30,000 feet.
4.1.3. Two flights in a 7-day period to or above 40,000 feet.
4.1.4. Two rapid decompressions in a 7-day period. These may be taken in combination with exposures above.
4.1.5. At least 23 hours between exposures to rapid decompressions; at least 12 hours between exposures to or above 25,000 feet; at least 22 hours between exposures to or above 30,000 feet; and at least 46 hours between exposures to or above 40,000 feet.

4.1.6. The chamber exposure levels listed in this chapter are considered the maximum exposures permitted. Avoid maximum exposures except in extraordinary cases.

4.2. Hazardous Duty Pay. This pay is authorized for personnel assigned to inside instructor and observer duty in a hyper/hypobaric pressure chamber. Members on competent orders to perform this duty who do not participate in a hypobaric flight or hyperbaric dive during a month, must be reported to their appropriate accounting and finance office for stop-pay action for that month.

4.3. Starting Hazardous Duty Pay. To start hazardous duty pay, provide the local Air Force finance office a copy of orders assigning the individual to inside instructor and observer duty in an organization that participates in hyperbaric and/or hypobaric chamber exposures. Include a signed letter from the local commander (i.e., medical group commander) indicating that the individual participates in chamber exposures, and a DD Form 114**, Military Pay Order,** with a certifying officer's signature for the effective date (i.e., exposure date). Separate Hazardous Duty Orders are not required but can continue to be used if already available.

4.4. Authority To Issue Orders. The authority to issue orders that assign a member to duty as an instructor or observer, according to Executive Order No. 11157, Section 109, is delegated to:
4.4.1. Chief of Staff, US Air Force.
4.4.2. MAJCOM commanders.
4.4.3. Numbered Air Force commanders.
4.4.4. Support group commanders.
4.4.5. Medical unit commanders.
4.4.6. Commander, Human Systems Center.
4.4.7. Commander, United States Air Force School of Aerospace Medicine.
4.4.8. Send other requests for orders through command channels to HQ AFPC/SGCB, with an information copy to HQ AFMOA/ SGOO. All requests to HQ AFPC/SGCB must be fully documented and justified.

Chapter 5

METHODS USED IN THE TRAINING PROGRAM

5.1. Aerospace Physiological Training Facilities. Aerospace physiology training of US Air Force personnel conducted by US Army, US Navy, FAA, National Aeronautics and Space Administration, or foreign countries does not fulfill the requirements of this instruction. Department of Defense (DoD) activities may request to use Air Force physiological training facilities. The Air Force will provide this training support to US Navy, US Coast Guard, and US Army organizations according to existing support agreements. Bases and DoD activities may directly communicate. The FAA may ask base physiological training flights to provide instruction for civilian aircrew personnel according to the USAF and FAA agreement.

5.2. Classroom Lectures. The Chief, Aerospace Physiology is responsible for conducting the training programs. Aerospace physiologists give most classroom lectures. Optional exceptions include: fully qualified aerospace physiology and life support technicians may provide lectures on protective equipment and survival emergency escape, emergency procedures, ejection seat and parachuting techniques. During training, fully qualified aerospace physiology technicians provide lectures on the physiological aspects of protective equipment and survival emergency escape, emergency procedures, ejection seat, and parachuting techniques. If available, qualified parachutists should give the survival equipment and emergency escape from aircraft lectures. Survival, Evasion, Resistance, Escape (SERE) or qualified Life Support Instructors also give high altitude aircraft survival, protective equipment and emergency egress lectures. Fully qualified aerospace physiology technicians may provide cabin pressurization and altitude chamber flight lectures. Aerospace physiology training in life support equipment and survival is designed to complement training received by Life Support/SERE instructors. Individuals who have attained a primary AFSC of 4M051 or higher, and an Associates Degree in Aerospace Physiology Technology, or other life sciences associate degree, may be certified by the local Chief, Aerospace Physiology to teach the subjects listed in paragraph 6.1.1. during FAA, Operational Support Training and High Altitude Parachutist Course.

5.3. Training Classes. Classes should be small to stimulate individual participation. Refresher classes should be limited to 16 students. Schedule classes to provide homogeneous groups (e.g., rated and nonrated duties in similar aircraft, crew members performing duty in the same weapon system category). Recommend the use of locally developed student handouts.

5.4. Qualified Aerospace Physiology Training Technicians. During training, these technicians conduct practical demonstrations, as required, in the physiological aspects of:
5.4.1. The use of oxygen, protective, and survival equipment.
5.4.2. The use of pressure suits.
5.4.3. Night vision and night vision goggles.
5.4.4. Methods used to escape from aircraft.
5.4.5. Parachute techniques.
5.4.6. An aerospace physiologist will annually monitor training activities conducted by aerospace physiology or life support technicians conducting training classes for the APTF.

5.5. Audiovisual Products. You may use audiovisual products to enhance lectures. However, these do not take the place of lectures or demonstrations.

5.6. Low-Pressure Chamber Flights. Use low-pressure chamber flights to demonstrate the hazards associated with changes in barometric pressures and the proper use of protective equipment. These hazards include the symptoms of hypoxia, pressure breathing, mechanical effects of barometric pressure change, and proper use of oxygen equipment.

5.7. Written Tests. Written tests are required of all initial students. Students need a score of at least 80 percent to pass. You may not use programmed text-type tests that include the correct answers to each question. The student should review all tests and correct them to 100 percent. Scores below 80 percent require more instruction and retest. When a student must do this, enter both scores (example 75/95) on AF Form 699, **Physiological Training Record.** An aerospace physiologist certifies satisfactory training on AF Form 702,**Individual Physiological Training Record;** and AF Form 1274, **Physiological Training.** Report personnel who demonstrate inadequate knowledge of the instructed subject to their unit commanders and arrange for them to repeat the course of instruction.

Chapter 6

TRAINING PHASES

6.1. Original Instruction. This phase is conducted early in the training of flying personnel. It lasts approximately 24 hours (3 days). It includes Type 1, Type 2, and rapid decompression chamber flights and instruction in the following subjects:
6.1.1. Physiological Effects of Altitude. Teaches the characteristics of the atmosphere; anatomy and physiology of circulation and respiration; circulatory and respiratory responses to environmental stresses; hypoxia and hyperventilation, their causes, prevention, recognition, and treatment; and physiology of trapped and evolved gas problems, including cause, prevention, recognition, and treatment.
6.1.2. Human Performance. Deals with self-imposed stresses, oxygen discipline, alcohol, carbon monoxide, blood donation, shock, extremes of temperature, diet, dehydration, drugs, fatigue, circadian rhythms, physical fitness, principles of cockpit/crew resource management, and situational awareness.
6.1.3. Oxygen Equipment. Deals with the various types of oxygen masks and regulators; aircraft oxygen systems; gas, liquid, on-board oxygen generation systems and chemical oxygen; servicing procedures; and the physiological aspects of the emergency use and inspection of this equipment.
6.1.4. Cabin Pressurization and Decompression. Teaches the principles of cabin pressurization, rapid and slow decompression and the possible physical and physiological consequences, and the procedures to be followed after cabin depressurization.
6.1.5. Pressure Breathing. Deals with the need for pressure breathing, its limitations, pressure breathing techniques, and precautions.
6.1.6. Principles and Problems of Vision. Teaches basic anatomy of the visual system, physiology of day and night vision, factors affecting vision, dark adaptation, scanning methods, flash blindness and hazards of lasers. Include a demonstration in the night vision trainer and practice in methods of improving night vision. Night Vision Goggles training may be given to those crewmembers whose unit mission includes their use, to emphasize the physiological aspects of proper use and adjustment.
6.1.7. Spatial Disorientation and Other Sensory Phenomena. Teaches how the body orients itself on the ground and compares this with the effects of flight. Teaches the characteristics and specific examples of Type 1, 2 and 3 spatial disorientation. Includes an explanation of the central and peripheral visual modes and their effects on orientation. Address illusions derived from vision, semicircular canals and otolith organs to include the G excess effect. Covers problems associated with motion sickness. This training for refresher students is required only for pilots, navigators, flight surgeons, aerospace physiologists, flight engineers, boom operators and loadmasters. All UFT students are given a ride in a spatial disorientation demonstrator.

6.1.8. Noise and Vibration. Teaches the basic anatomy of hearing. Discussion includes the sources, harmful effects of exposure to hazardous noise and vibration, and means to avoid overexposure.
6.1.9. Speed. Deals with the aeromedical aspects of high speed flight, aircraft ejection, flight instruments, cockpit temperatures, closure rate, visual problems, etc.
6.1.10. Acceleration. Teaches the physical and physiological effects of acceleration forces (G-forces), human tolerance, and means used to raise G tolerance and endurance.
6.1.11. Escape From Aircraft. Teaches the physiological principles and problems of escape under different conditions of altitude and speed. Covers the principles of crash survival.
6.1.12. Physiological Aspects of Ejection Seat and Parachute Training. Includes a mandatory ride in the air charged ejection seat trainer for all UFT students. Other students undergoing original or operational support training, who are going to fly in ejection seat aircraft, receive instruction and a ride in this trainer if it is available at the local physiological training unit. When required by MAJCOM supplements or UFT syllabi, includes training in the care and use of the parachute, parachute control and parachute landing techniques.
6.1.13. Prechamber Flight Indoctrination. Teaches the purpose of the chamber flight and the chamber flight profiles.
6.1.14. Exceptions to Original Instruction Requirements. USAF students arriving at USAF Undergraduate Flying Training facilities following Joint Specialized Undergraduate Flying Training (JSUFT) are exempt from the following training requirements.
6.1.14.1. Rotary Wing students are exempt from the Type 2 chamber flight and rapid decompression chamber flight as directed by paragraph 6.1. They are also exempt from the Cabin Pressurization and Decompression lessons as directed by paragraph 6.1.4, the Acceleration lessons as directed by paragraph 6.1.10, and the mandatory air charged ejection seat trainer ride as directed by paragraph 6.1.12.
6.1.14.2. Tanker-Transport students are exempt from the Acceleration lessons as directed by paragraph 6.1.10 and the mandatory air charged ejection seat trainer ride as directed by paragraph 6.1.12.

6.2. Refresher Instruction:
6.2.1. Nature and content of refresher instruction:
6.2.1.1. This course includes at least 4 hours of classroom instruction and may require more than 4 hours in order to adequately address the pertinent topics peculiar to specific weapon systems.
6.2.1.2. Reviews subjects presented in original training with emphasis on weapon system problems, human performance enhancement, situational awareness, spatial disorientation and physiological problems.
6.2.1.3. Lesson objectives designed for specific weapon systems and developed by the Trainer, Attack, Reconnaissance, Fighter (TARF), Tanker, Transport, Bomber (TTB), and Helicopter (HELO) committees will be used for TARF, TTB, and HELO refresher training courses.
6.2.1.4. TARF, TTB, and HELO aircrew will receive a Type 37 chamber flight, attachment 6.
6.2.1.5. Altitude chamber flights for refresher HELO aircrew training may be waived by user MAJCOM, if all flying operations will remain below 10,000 feet MSL. Annotate AF Form 702 with statement "chamber flight waived IAW MAJCOM supplement to AFI 11-403."
6.2.1.6. Students may ride in spatial disorientation demonstrator if available
6.2.1.7. Exceptions for altitude chamber requirement granted to aircrew following bleomycin chemotherapy. **AF Form 1042, Medical Recommendations for Flying or Special Operational Duties,** will list the following restriction statements in the Remarks block:
No assignment to aircraft requiring routine use of oxygen equipment. Waiver from altitude chamber exposure. Ground training without supplemental oxygen is acceptable.
Annotate the **AF Form 699, Physiological Training Record, block 19, Chamber Flight, Type,** with the following statement: *Waived-see back.* Annotate the back of the **AF Form 699** with the following statement: *Altitude chamber exposure waived per AF Form 1042 due to Class II-C waiver for bleomycin chemotherapy.* Annotate **AF Form 702, Individual Physiological Training Record, Remarks block,** with the following statement: *Chamber flight waived IAW Class II-C waiver restrictions.*
6.2.2. General officers may attend a 2 1/2-hour refresher course tailored to the needs of their current assignments. This course includes a Type 37 Chamber Flight. A chamber flight may not be mandatory, **see paragraph 2.1.4.**
6.2.3. Operational support personnel returning for refresher training will be given a TARF, TTB, or HELO course, as appropriate. Refresher trainees will receive a Type 37 chamber flight, unless MAJCOM has waived the HELO refresher chamber requirement as explained in paragraph 6.2.1.
6.2.4. High Altitude Parachutist (HAP) students returning for refresher training will be given a TTB course. They will receive specific instructions related to preventing HAP mishaps. HAP students should be given a modified Type 37 chamber flight as described in attachment 6, paragraph A6.3.

6.3. Operational Support Instruction. This course should be about 8 hours long. Recommend it include the subject matter described in paragraph 6.1.1 through 6.1.5, 6.1.8, 6.1.10, 6.1.11, and 6.1.13. Flight photographers and observers should receive subject matter described in 6.1.6. Students take part in the Type 3 and rapid decompression flights described in chapter 7 and attachment 4. ***NOTE:*** A Type 1 chamber flight may be used in lieu of the Type 3 chamber flight provided that the student also participates in a rapid decompression flight. The Type 1 and rapid decompression chamber flights must be accomplished IAW paragraph 7.5. The Operational Support student(s) will not be a hypoxia demonstration subject at FL350 or FL300.

6.4. Initial High Altitude Parachutist (HAP). Initial HAP course is available for qualified jump rated personnel flying in Air Force aircraft when required by Air Force, MAJCOM, US Army, and US Navy directives. This course is for those who have not completed original physiological training. It lasts at least 8 hours and includes the subjects described in paragraph 6.1.1 through 6.1.5, including discussion of HAP mishaps, HAP oxygen equipment, paragraph 6.1.6, paragraph 6.1.8, paragraph 6.1.11 and paragraph 6.1.13, and a Type 5 Flight (attachment 5). Emphasis is placed on the high altitude aspects of these subject areas as they pertain to HAP operations. Include discussion of motion sickness, disorientation, and visual illusions related to free fall and parachuting. HAP students will take a test designed for this course. In isolated circumstances, when HAPs cannot be trained as a homogeneous group, they may be trained with operational support or original students using a Type 3 or Type 1 chamber flight if coordinated with the MAJCOM and all other provisions of this paragraph are met for the parachutist.

Chapter 7

CHAMBER FLIGHTS

7.1. Supervision of Flights. An officer who meets the qualifications described in chapter 3 supervises chamber flights. During all chamber flights, a designated flight surgeon must be able to respond by telephone within two minutes and get to the chamber within 15 minutes.

7.2. Postflight Restrictions. The following are postflight restrictions for personnel who take part in chamber flights:

7.2.1. No physical exercise, strenuous or extended duty for a period of 12 hours.

7.2.2. Do not assign personnel as flying crew members for at least 12 hours after completion of any chamber flight above 25,000 feet.

7.2.3. Personnel may fly as passengers in aircraft during this period but should remain below a cabin altitude of 10,000 feet.

7.2.4. There is no restriction on flying as a crew member or passenger after a chamber flight to 25,000 feet or below except that they should remain below a cabin altitude of 15,000 feet.

7.3. Chamber Flight Exposures After Diving. Personnel must delay altitude chamber and aerial flight exposures for at least 24 hours following compressed air diving. This includes SCUBA (self-contained underwater breathing apparatus) diving, surface supplied diving, or hyperbaric chamber exposure. If the dive requires a decompression stop, recommend 48 hours elapse prior to aerial flight or altitude chamber exposure. **EXCEPTION:** Pararescue and Combat Control personnel assigned to Air Force Special Operations Command Special Tactics Units will follow guidelines per US Navy Diving Manual, Volumes I and II, on flying after diving restrictions. Specifically, these divers should not fly for 12 hours after surfacing from a decompression dive or for two hours following a no decompression dive. If aircraft cabin pressure is maintained below 2,300 feet altitude, then flying is permitted immediately after any breathing mixture (air, N_2 O_2 , or HeO_2) dive. Flying is permitted immediately after 100-percent oxygen diving. (Ref: AFI 11-401, Flight Management)

7.4. Scheduling Requirements. The scheduling base ensures that personnel scheduled for training meet appropriate medical standards. Means of verification between the Chiefs of Aeromedical Services and Aerospace Physiology must be established. Trainees should bring their AF Form 702 and appropriate medical clearances. In the absence of written medical clearance, telephone verification with the trainee's home medical facility is authorized. This must be annotated on the back of the trainee's AF Form 699. Print or type the name of the person who verified the clearance. During the chamber preflight briefing, ask trainees about their current physical status (colds, sinusitis, headaches, abdominal pain, digestive upset, ear trouble, pregnancy, injuries, etc.). Trainees who have been involved in compressed air diving activities within the past 24 hours or have donated blood within the past 72 hours cannot participate in chamber flights. Trainees whose beards, mustaches, or facial cosmetics interfere with a safe oxygen mask fit may not participate in chamber flights. Refer trainees with physical problems to the flight surgeon. Here are the required medical clearance forms:

7.4.1. For Military Personnel:

7.4.1.1. Copy of AF Form 1042, **Medical Recommendation for Flying or Special Operational Duty,** DA (Army) Form 4186**, Medical Recommendation for Flying Duty,**or Naval Medical Form 6410/2, **Clearance Notice (Aeromedical),** indicating that a flying Class I, II, or III physical has been completed for flying personnel or candidates for flying positions. US Coast Guard, US Navy, and US Army personnel may present any of the forms previously listed, or may substitute a letter from their local flight surgeon certifying a group of trainees' medical fitness for the chamber flight. These same forms certify that nonflying personnel meet required medical standards.

7.4.1.2. US Air Force, Army, or Navy Reserve Officer Training Corps (ROTC) cadets will present evidence of satisfactory completion of SF 88, **Report of Medical Examination** or DD Form 2351, **Medical Examination Review Board (DODMERB) Report of Medical Examination,** accomplished within 36 months of the scheduled training. ***NOTE:*** Before scheduling cadets for training, ROTC detachment must send Aerospace Physiology Unit copies of SF 88, **Report of Medical Examination,** and SF 93, **Report of Medical History,** or DD Form 2351, **Medical Examination Review Board (DODMERB) Report of Medical Examination,** and DD Form 2492, **Report of Medical History.** Aerospace Physiology unit will have local Flight Surgeon review these forms and stamp them **"Qualified to participate in altitude chamber training"** for all cadets physically qualified. Aerospace Physiology unit will then contact ROTC detachment and schedule cadets for appropriate training.

7.4.2. For Civilian Personnel:

7.4.2.1. Those undergoing US Air Force or FAA physiological training chamber profiles must present a copy or original of current FAA Form 8500-8, **FAA Medical Certificate**flying class I, II or III, or the same forms listed in paragraph 7.4.1 indicating that they meet medical standards.

7.5. Course Completion Requirements. Students who do not complete chamber flights within 90 calendar days of academic training must repeat the academics listed in paragraph 6.1.1, paragraph 6.1.3, paragraph 6.1.4, paragraph 6.1.5 and paragraph 6.1.13 prior to their chamber flight.

7.6. Rates of Ascent and Descent. Rates of ascent and descent for most chamber flights must not exceed 5,000 feet per minute. Exceptions include the rapid descent portions of the Type 2 and Type 5 Flights, the rapid ascent portion of the Type 5 and Type 37 Flights, the Rapid Decompression Flight, and emergency operations. Type 37 chamber flights for refresher classes will descend at 2,500 feet per minute below 18,000 feet. HAP trainees will descend from 25,000 feet to 15,000 feet at 10,000-12,000 feet per minute.

7.7. Maximum Number of Students Authorized on Chamber Flights. The maximum number of students on a chamber flight is the maximum number designed to be held by the main chamber or lock compartment.

7.8. Inside Observer Requirements. Inside observer requirements for all chamber flights except refresher flights are 2 for up to 10 students and 3 for 11 or more students. For refresher flights (Type 37), one fully qualified inside observer is permitted when there is only one student and that student is a crew member, a flight nurse or flight surgeon. Operational Support and HAP refresher chamber flights, whether 1 or 16 students, will have a minimum of 2 fully qualified inside observers.

7.9. Chamber Reactor Plan. A hypobaric chamber reactor plan is required that covers the potential need for hyperbaric oxygen treatment. This plan will include:

7.9.1. The location, operating hours, telephone numbers, and capabilities of the closest hyperbaric treatment facilities.

7.9.2. Available means for transporting chamber reactors.

7.9.3. Location and operation of appropriate oxygen equipment to treat reactor.

7.9.4. Information relative to contacting the Armstrong Laboratory Hyperbaric Center (AL/AOH), Brooks AFB TX.

7.10. Chamber Flight Objectives and Demonstrations. The flights described in attachments 2 through 6 are performed in low-pressure chambers.

7.10.1. You should conduct hypoxia demonstrations within the limits of useful consciousness and should not terminate them until all trainees have experienced their hypoxia symptoms. Inside observers should encourage students to recover independently, without assistance from observers or other students.

7.10.2 For hypoxia demonstrations on all refresher flights, masks and regulators should be configured as they would be in flight, as well as can be simulated. For example, C-130 crewmembers will generally have regulators turned ON and 100% O_2 selected. Helmets will usually be off. Likewise, the sue of quick-don masks should be encouraged for those using them operationally. Note that quick-don cannot be used during denitrogenation.

7.10.3. Give a rapid decompression flight to each trainee after a Type 2 or Type 3 chamber flight. Objectives include giving the trainee practical experience in applying the techniques and principles learned in the classroom to an accidental loss of cabin

pressure. All personnel must have had an ear and sinus check within two hours of a rapid decompression flight. You must set the main chamber altitude at approximately 30,000 feet and the lock at 8,000 feet pressure altitude to produce the decompression to 22,000 feet. ***NOTE:*** Make sure that students are not exposed to a pressure differential greater than 4.7 pounds per square inch. If possible, the students should wear the same type of oxygen masks that they use in aerial flight. The students should don their masks before or after the decompression, depending on their normal use of oxygen equipment during routine aircraft operations. An aerospace physiologist must be immediately available (minimum response time of 30 seconds). The inside observer gives the instruction during the flight.

7.10.4. A flight surgeon as an inside observer directly monitors medical evaluation flights. Flight surgeons do not qualify for hazardous duty incentive pay since these flights are so rarely indicated and therefore the Air Force does not consider them a routine and integral part of the flight surgeon's assigned mission.

7.10.5. You must conduct (or limit) equipment check flights as required to check the performance of chambers, oxygen equipment and protective devices. You must not use hypobaric training chambers to test and evaluate life support equipment (oxygen regulators, oxygen masks, automatic parachute actuators, etc.) involved in physiological incidents or aircraft mishaps.

7.10.6. MAJCOMs may develop special flight profiles to meet specific training requirements. HQ AFMOA/SGOO must approve these profiles before using them.

7.10.7. Demonstration of appropriate hypoxia recovery techniques is a course requirement for all Original, High Altitude Parachutist, and Operational Support students. Students should be critiqued on their ability to accomplish all required steps for complete recovery, to include "gang-loading" regulator, putting mask on face, checking oxygen systems, and communicating potential problems over the intercom.

Chapter 8

PRESSURE SUIT TRAINING

8.1. Pressure Suit Training Requirements. Conduct pressure suit training and support for personnel who routinely fly at 50,000 feet MSL or above. This training is mandatory when the pressure suit assembly is initially issued and fitted. Individuals must not take part in any flight while wearing a pressure suit that was not fitted by qualified Air Force physiological support personnel.

8.2. Original Pressure Suit Training. Original pressure suit training including survival and life support training consists of no less than 16 hours of instruction. MAJCOMs determine the content of the course.

8.3. Passenger Pressure Suit Training. The Commander, Physiological Support Squadron (PSPTS), closely monitors passenger pressure suit training. The MAJCOM determines the content of the course. Passenger pressure suit training is good for 90 days. Exception: rated personnel who receive passenger pressure suit training can receive refresher pressure suit training every 3 years

8.4. Refresher Training. Conduct refresher training every 3 years. Pressure suit training must be broad enough to meet the requirements of chapter 6, so that pressure suit and routine refresher training are done at the same time. Training should include emphasis in both the high altitude aircraft and the companion training aircraft.

Chapter 9

CENTRIFUGE TRAINING AND OPERATIONS

9.1. Overview. Conduct centrifuge training and support for personnel who routinely fly high performance aircraft in which the high G environment poses a significant hazard.

Conduct training at authorized facilities according to AFI 11-404 and MAJCOM instructions regarding centrifuge training for aircrew of high performance aircraft. Only a qualified Aerospace Physiologist may certify centrifuge training on an AF Form 702, Individual Physiological Training Record.

9.2. Application. This chapter applies to centrifuge training and operations conducted at the Physiological Training Center (PTC), Holloman AFB NM and Pilot Instructor Trainees at Randolph AFB TX who are trained at Brooks AFB TX.

9.3. Crew Composition and Qualifications:
9.3.1. The minimum centrifuge crew will consist of an Aerospace Physiology Officer (APO), Flight Surgeon (FS), lecturer, operator, and crew chief. When scheduling and staffing permit, assign a swingman to the team.
9.3.2. The Chief of the PTC will establish qualification criteria and procedures for all members of a centrifuge crew with the exception of the FS.
9.3.3. The Chief of Aerospace Medicine, Holloman AFB will establish qualification criteria and procedures for the FS (or approved alternate member of a centrifuge crew). ***NOTE:*** Under austere staff conditions, the Chief of Aerospace Medicine may substitute a centrifuge qualified Physician's Assistant or Nurse as part of the centrifuge crew.
9.3.4. The Chief of the PTC and the Chief of Aerospace Medicine develop and document appropriate initial and refresher training plans defining qualification requirements and procedures for all centrifuge crew members.

9.4. Electrocardiographic Monitoring. Monitor all centrifuge riders except rated aircrew members and Holloman PTC personnel with an Electrocardiogram (ECG). You must monitor all centrifuge runs using ECG instrumentations by a centrifuge-qualified FS.

9.5. Training for Other Personnel:
9.5.1. Any US Air Force, US Navy, US Army, or US Marine Corps rated aircrew member, aerospace physiologist, aerospace physiology technician, life support technician, or aeromedical specialist may ride any profile up to positive 9 G_z . They must have taken the associated academic course and present proof of at least a current US Air Force Class III flight physical or service equivalent indicating fitness for centrifuge exposure.
9.5.2. Handle approval for foreign military personnel either through normal channels for Initial Centrifuge Training or official embassy request channels.
9.5.3. Other personnel may participate in centrifuge exposure only on approval originating from a United States government sponsoring agency. Requests must include reason for participation, G limits to be used, and proof of US Air Force certification of medical fitness for centrifuge exposure.

9.6. G LOC Prevention. Personnel who routinely fly high performance aircraft should reference AFPAM 11-404, *G Awareness for Aircrew.* This pamphlet covers basic physiology of high G flight and provides all high G aircrew with a source of reference for information and techniques regarding the prevention of G LOC.

Chapter 10

EQUIPMENT REQUIRED

10.1. Tables of Allowance (TA). TAs 886 and 016 list equipment used by physiological training flights. You may use item-specific TAs, if applicable, for items or quantities not listed in TA 886 and TA 016.

10.2. Issue or Transfer of Training Devices. HQ AFMOA/SGOO must approve issue or transfer of training devices. This includes the issue, transfer, or loan of hypobaric (low-pressure) chambers, man-rated hyperbaric (compression) chambers, ejection seat trainers, spatial disorientation demonstrators, night vision trainers, and oxygen regulator training aid Type MQ-1. The Ogden Air Logistics Center is the functional manager for funding, procuring, installing, modifying, maintaining, moving, repairing, and storing these controlled items.

10.3. MAJCOM Configuration Control Board. The consolidated MAJCOM Configuration Control Board (CCB) for hypobaric and hyperbaric chambers, ejection seat trainers (MH-15/T-43) and spatial disorientation trainers is HQ AFMOA/SGOO. You will not require separate MAJCOM CCB action, therefore, for modifications to these controlled items.

Chapter 11

MAINTAINING PHYSIOLOGICAL TRAINING RECORDS, FORMS PRESCRIBED

NOTE: You must fill out the following forms as described in the Aerospace Physiology Forms Handbook or automated reports approved by HQ AFMOA/SGOO.

11.1. AF Form 361, Chamber Reactor/Treatment Report. Aerospace Physiologist from unit where reaction occurred will send AF Form 361 on hospitalized cases and cases diagnosed as evolved gas decompression sickness, whether hospitalized or not, to HQ AFMOA/SGOO, 110 Luke Avenue, Room 400, Bolling AFB DC 20332-7050, and AL/AOH, 2510 Kennedy Circle, Suite 3, Brooks AFB TX 78235-5119. MAJCOMs may direct additional copies. Letters of transmittal are not required. ***NOTE:*** If death occurs in circumstances that suggest a hypo/hyperbaric chamber exposure may have been a contributing factor, include HQ USAF/SG as a secondary addressee in the death report. The reactor's equipment should be checked, the oxygen source analyzed, and the results annotated in the remarks section.

11.2. AF Form 699, Physiological Training Record. Fill out this form for each individual who receives training prescribed by this instruction. File the form at the physiological training unit giving the training. Retain completed AF Forms 699 for 6 years.

11.3. AF Form 700, Physiological Training Monthly Report (RCS: HAF-SGP(M) 7137). This report serves to:

11.3.1. Assess future Air Force training requirements.

11.3.2. Procure and assign specialized equipment.

11.3.3. Provide for the availability of trained officers and enlisted personnel to conduct the program.

11.3.4. Make studies of reactor cases, and monitor the work load at training flights.

11.3.5. The Chiefs of Aerospace Physiology, Commander, Physiological Support Squadron, and officers in charge of individuals receiving hazardous duty incentive pay for chamber duty prepare a monthly report in software program format. Send the original copy and a backup disk (labeled with APTF and date) to HQ AFMOA/SGOO, 110 Luke Avenue, Room 400, Bolling AFB DC 20332-7050, not later than the 5th workday (Beale AFB, PSPTS not later than the 10th workday) of each month. The initiating office keeps one copy and sends one copy and a backup disk to the command coordinator. Letters of transmittal are not required. Discontinue reporting during emergency conditions, as identified in USAF emergency action procedures.

11.4. AF Form 702, Individual Physiological Training Record. For aircrew members, keep a current copy of this record as a permanent part of the Individual Flight Record (IFR). For all other personnel, keep this record as a permanent part of the individual's health record. Aerospace physiology personnel may keep this record in their instructor folders.

11.5. AF Form 712, Instructor's Flight/Dive Record. Fill out this form for inside instructor or observer time.

11.6. AF Form 1274, Physiological Training. Issue AF Form 1274 to each individual who completes original, refresher or operational support training. A physiological training officer must sign this form.

11.7. FAA Form 3150-1, Physiological Training. Issue FAA Form 3150-1 to each individual who completes the Federal Aviation Administration physiological training course. A physiological training officer must sign this form. APTFs may obtain these forms through the normal Air Force distribution system.

11.8. Supply of Forms. All forms may be obtained from the base Publishing Distribution Office (PDO) except for AF Form 361 and FAA Form 3150-1.

11.8.1. AF Form 361 is stocked and issued by PDO 4101A, 648 SPTG/IMPD, 8006 Chennault Road, Suite 2, Bldg 1150, Room 108, Brooks AFB TX 78235-5314

11.8.2. FAA Form 3150-1 is stocked and issued by Chief, Physiological Operations &Training Section/AAC-143, FAA Aeronautical Center, P.O. Box 25082, Oklahoma City, OK 73125.

11.9. Exposure Numbers. USAFSAM/FP is responsible for administering, controlling, and managing the exposure number program. All Aerospace Physiologists and Aerospace Physiology Apprentices will be issued an exposure number upon

completion of their AFSC awarding course. All other individuals that require an exposure number must be coordinated through USAFSAM/FP. Do not assign exposure numbers at the unit level.
11.9.1. Temporary exposure numbers. When a individual performs duty as an inside observer that is not assigned an exposure number, the temporary exposure number 9999 is used for that individual for that flight/dive. If more than one individual takes part in the same flight/dive, enter the temporary exposure number in descending order 9998, 9997, etc. These temporary numbers are not to be permanently assigned to that individual.
11.9.2. Control of exposure numbers. APTFs will send an exposure number listing of all assigned and attached personnel to USAFSAM/FP, 2513 Kennedy Circle, Brooks AFB TX 78235-5123. The listing is to be sent no later than the last duty day of January on an annual basis.

Chapter 12

STANDARDIZATION AND EVALUATION PROGRAM

12.1. Goals. The goals of this program are to insure:
12.1.1. All aircrew training courses listed in **Chapter 2** are standardized.
12.1.2. Aerospace Physiology Training Flights (APTF) personnel are teaching the approved standardized courseware.
12.1.3. Presentation of standardized courseware is conducted by qualified personnel.
12.1.4. Standardization of the operating procedures and techniques employed by APTF.

12.2. Objectives. The objectives of this program include, but are not limited to:
12.2.1. Educating personnel on the requirements and responsibilities of the standardized curricula program.
12.2.2. Improving the quality of aircrew training and customer satisfaction through continuous improvement of courseware and instructor proficiency and operational performance. This applies to all aspects of aerospace physiology, human performance enhancement, AFI 36-2243, *Cockpit/Crew Resource Management (CRM),* and AFMAN 11-210, Vol. I, *Instrument Refresher Course,* training conducted by aerospace physiology personnel.

12.3. Responsibilities
12.3.1. HQ AFMOA/SGOO is responsible for the USAF AP Course Standardization and Evaluation Program including funding and selection of Stan/Eval inspectors. Funding will be provided to USAFSAM/FP.
12.3.2. USAFSAM/FP is responsible for managing the AP Stan/Eval program to include scheduling inspection teams, allocating TDY funds, and providing program status reports to HQ AFMOA/SGOO.
12.3.3. MAJCOM Coordinators for Aerospace Physiology are responsible for compliance and oversight of the Stan/Eval program within their respective MAJCOM. Coordinators will track inspection results, follow-up on required corrective actions, and provide status reports to USAFSAM/FP.
12.3.4. Chiefs, Aerospace Physiology Training Flights and Commander, 9th Physiological Support Squadron insure compliance by developing a unit Operating Instruction (OI) that provides specific procedures necessary to achieve the goals and objectives of this program. Provide local program oversight, coordinate on findings and recommendations, and remedy deficiencies identified during Stan/Eval inspections.
12.3.5. Chairman, Department of Aerospace Physiology, USAF School of Aerospace Medicine conducts and funds an annual Utilization & Training Workshop. Select MAJCOM representatives will attend this meeting to update standardized courseware. Current AF/XOOA operational focus, initiatives and needs will drive aerospace physiology courseware development, modification and presentation.
12.3.6. Standardization and Evaluation Inspection Teams. MAJCOM Coordinators will nominate command aerospace physiology personnel (officer/enlisted) to serve as Stan/Eval inspectors. Nominees will be forwarded to HQ AFMOA/SGOO for approval.
The approved list of inspectors will be forwarded to USAFSAM/FP.
12.3.6.1. Stan/Eval teams will be composed of a minimum of one officer and one enlisted member. Teams are responsible for inspection, evaluation, and outbrief of designated Medical Group personnel (see paragraph 12.8). Inspectors will document instructor evaluations and forward a copy to the respective MAJCOM Coordinator and USAFSAM/FP following the outbrief.

12.4. Types of Evaluations
12.4.1. Annual Instructor Evaluations. All APTF instructors will be evaluated annually. Eligibility will occur within the three calendar month period preceding the anniversary of the last inspection and must be completed not later than 13 calendar months from the last evaluation.

12.4.2. No-Notice Instructor Evaluations. At the request of the host MAJCOM, a No-Notice evaluation may be conducted six months after an annual evaluation. This interim evaluation may be used if an APTF fails to demonstrate compliance or proficiency. The no-notice evaluation program is not a substitute for, or a replacement of the scheduled annual evaluation.

12.5. Scheduling Stan/Eval Inspections.
12.5.1. Upon request, each APTF Chief will provide their respective MAJCOM Coordinator a copy of their six (6) month projected training schedule.
12.5.2. MAJCOM Coordinators will establish inspection dates for all APTFs in their MAJCOM. Dates are selected to insure that the widest spectrum of courses and the greatest number of instructors can be evaluated during each inspection. MAJCOM schedules will be sent to USAFSAM/FP.
12.5.3. USAFSAM/FP will provide fund cites and assign inspection teams against each MAJCOM schedule. The duration of inspections should not exceed 5 training days.

12.6. Grading Criteria. Follow the grading instructions on the *Stan/Eval Inspection (AFI 11-403 Curriculum) Form.* Ratings are based on compliance with the checklist items contained in the inspection form.
12.6.1. Critical Items identified in Section I of the *Stan/Eval Inspection Form,* are critical to the effectiveness of the USAF Aerospace Physiology Training Program. Critical items focus on:
12.6.1.1. Correct and complete employment of standardized courseware.
12.6.1.2. Poised instruction and positive military dress and behavior.
12.6.1.3. Establishing life saving skills, proficiency, and procedural knowledge of life support, survival and egress equipment.
12.6.1.4. Emphasizing mishap prevention by promoting sound flight and ground safety attitudes.
12.6.1.5. Ensuring strengths and weaknesses are identified and have been addressed.
12.6.1.6. Specific Operating Instruction procedures for employment of the Standardization and Evaluation program.
12.6.2. Ratings. The overall rating will not be higher than the lowest critical item rating. A rating of (U) in any one critical item is an automatic overall rating of UNQUALIFIED.

12.7. Explanation of Terms.
12.7.1. Deviation. Instruction not in accordance with standardized curriculum directives or lesson objectives.
12.7.2. Omission. Failed to use required lesson material, media, or lesson objectives.
12.7.3. Error. Provided incorrect information, procedures, or lesson objectives during instruction.
12.7.4. Minor. Did not detract from efficient accomplishment of the lesson objectives or adversely affect use of equipment, or violate safety.
12.7.5. Major. Detracted from efficient accomplishment of lesson objectives or adversely affected use of equipment, or violated safety.

12.8. Outbrief. The Stan/Eval inspection team will conduct a formal outbrief with the Chief and Superintendent of the APTF, the Aerospace Medicine Squadron Commander, and the Medical Group Commander. Outbrief preparation involves data collection, grading, reference materials, required follow-up actions, and preparation of any Stan/Eval Inspection Forms. The inspectors must cover performance and compliance with standardized courseware in detail.

12.9. Administration. Record the results of all evaluations on the *Standardization/Evaluation Inspection (AFI 11-403 Curriculum) Form*. Critique notes will be added to the form in the Comments portion of Section I. Sections II and III will be completed by the inspection team. Section IV is completed by the inspector, instructor evaluated, and instructor's supervisor. Section V documents corrective actions accomplished (within 30 days) following the Stan/Eval Inspection. The Chief, APTF must certify that these actions have been accomplished by signing Section V. **Copies of all certified evaluations will be forwarded to the respective MAJCOM Coordinator and USAFSAM/FP by the evaluation team**. Place a file copy in the appropriate instructor's folder, maintained by the APTF.

12.10. Forms Prescribed. AF Form 361, **Chamber Reactor/Treatment Report,** AF Form 699, **Physiological Training Record**, AF Form 700, **Physiological Training Monthly Report**, AF Form 702, **Individual Physiological Training Monthly Report,** AF Form 712, **Instructor's Flight/Dive Record,** AF Form 1274, **Physiological Training,** DD Form 114, **Military Pay Order,** FAA Form 3150-1, **Physiological Training.**

CHARLES H. ROADMAN II, Lt General, USAF, MC
Surgeon General

GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

References

AFPD 11-4, Aviation Service
AFI 11-401, Flight Management
AFI 11-409, High Altitude Airdrop Mission Support Program
AFI 48-101, Aerospace Medical Program
AFI 48-123, Medical Examination and Medical Standards
AFPAM 11-404, G Awareness for Aircrew
NATO STANAG 3114, Aeromedical Training of Flight Personnel
NATO STANAG 3473, Temporary flying Restrictions Due to Exogenous Factors Affecting Aircrew Efficiency

Abbreviations and Acronyms

ACC −Air Combat Command
AFB −Air Force Base
AFMOA −Air Force Medical Operations Agency
AFPC −Air Force Personnel Center
AFSC −Air Force Specialty Code
APO −Aerospace Physiology Officer
APTF−Aerospace Physiology Training Flight
BSC −Biomedical Sciences Corps
CAP −Civil Air Patrol
CCB −Configuration Control Board
CONUS−Continental United States
DoD −Department of Defense
DNIF −Duties Not Including Flying
ECG −Electrocardiogram
FAA −Federal Aviation Administration
FL −Flight Level
FS −Flight Surgeon
G LOC −G-Induced Loss of Consciousness
HAAMS−High Altitude Airdrop Mission Support
HAHO −High Altitude High Opening
HALO −High Altitude Low Opening
HAP −High Altitude Parachutist
HARMS −High Altitude Reconnaissance Mission Support
HELO −Helicopter Refresher Training
HQ −Headquarters
IFR −Individual Flight Record
JA/ATT−Joint Airborne/Air Transportability Training
MAJCOM −Major Command
MOU −Memorandum of Understanding
MSL −Mean Sea Level
NATO −North Atlantic Treaty Organization
NCOIC −Noncommissioned Officer in Charge
NVG −Night Vision Goggles
OST−Operational Support Training
PACAF −Pacific Air Force
PCS −Permanent Change of Station
PSPTS −Physiological Support Squadron
PSYOP−Psychological Operations
PT−Physiology Technician
PTC−Physiological Training Center
RAF −Royal Air Force
SA −Situational Awareness

SAAM −Special Assignment Airlift Mission
SCUBA −Self Contained Underwater Breathing Apparatus
SDO −Spatial Disorientation
SGO −Surgeon General Operations
SGOA −Surgeon General Operations Administration
SGOO−Surgeon General Operations Operational Medicine
STANAG−Standardization Agreement
TARF −Trainer, Attack, Reconnaissance, Fighter
TDY −Temporary Duty
TTB −Tanker, Transport, Bomber
UK −United Kingdom
USAF−United States Air Force
USAFE −United States Air Forces in Europe

Terms

HeO_2 —Heliox breathing mixture
G—Any force that produces an acceleration of 32.2 FPS (FPS = Feet Per Second), which is equivalent to the acceleration produced by earth's gravity.
G_x —G forces in a front to back and back to front direction.
G_y —G forces in a side to side direction.
G_z —G forces in an up-down direction. Positive G_z indicates a force felt from head to toe. Negative G_z indicates a force felt toe to head.
G-Excess Effect/Illusion—A somatogravic illusion induced by G forces acting on the otolith organs, resulting in misperception of bank angle or pitch.
N_2 —Nitrogen
O_2 —Oxygen
N_2 O_2 —Nitrogen Oxide

TYPE 1 HYPOBARIC CHAMBER FLIGHT

A2.1. Type 1 Hypobaric Chamber Flight Goals. This flight allows trainees to experience the effects of barometric pressure change and to practice principles and techniques learned in the classroom. Specific training objectives include giving trainees experience in:

A2.1.1. Mechanical effects of pressure change (ear, sinus, and abdominal problems).
A2.1.2. Positive pressure breathing.
A2.1.3. Recognition and treatment of hypoxia at various altitudes, both personally and in others.
A2.1.4. Prevention, recognition, and treatment of hyperventilation during various flight conditions.
A2.1.5. Uses and characteristics of supplemental oxygen and life support protective equipment.
A2.1.6. Visual problems resulting from decreased oxygen during night flying conditions.
A2.1.7. Practice of proper oxygen discipline in a low-pressure environment.
A2.1.8. Development of confidence in life support oxygen equipment.
A2.1.9. Practice of preflight and in-flight checks of oxygen equipment and systems.

NOTE: Additional objectives may be included based on MAJCOM requirements.

A2.2. Preflight Briefing. The instructor tells the trainees the purpose and procedures of the flight. The chamber flight should not exceed 2 hours. All chamber time should be used for training activities. One hundred percent oxygen is used during ascent. The instructor explains why, in pressurized aircraft, the oxygen is regulated with the setting on "Normal" unless conditions of the flight dictate the use of 100-percent oxygen.

A2.3. Simulated Flight in Low-Pressure Chamber Procedures (Time in Minutes--90 Minutes Total):

A2.3.1. During mask fitting, preflight check of oxygen equipment, and intercommunication check, have trainees don oxygen masks with regulator set at "100-percent oxygen."
A2.3.2. During ear and sinus check, ascend 5,000 feet and descend to ground level.
A2.3.3. Before beginning ascent to peak altitude, make sure that 30 minutes of denitrogenation have been completed.
A2.3.4. During ascent to 35,000 feet, demonstrate and practice using oxygen regulators. Discuss value of frequent intercommunication checks. Demonstrate with a volunteer trainee the time of useful consciousness at 35,000 feet without oxygen. Discuss emergency procedures concerning oxygen equipment failures. Briefly discuss decompression symptoms and possibilities of experiencing decompression sickness.
A2.3.5. Descend to 30,000 feet. Discuss problems of parachute descent from high altitude. Demonstrate with a volunteer trainee the effects of acute hypoxia on muscular coordination, mental concentration, etc. Demonstrate time of useful consciousness.
A2.3.6. Descend to 25,000. Pair off trainees, except those in Flight Level (FL) 350 and FL 300 demonstrations, and have them alternately experience hypoxia within limits of useful consciousness. Resume oxygen and check all trainees.
A2.3.7. During descent to 18,000 feet, have trainees remove mask at FL 220 and experience mild hypoxia.
A2.3.8. At 18,000 feet, use test cards to demonstrate effect of hypoxia on night visual acuity. Descend to 10,000 feet while demonstrating portable oxygen assemblies. Descend to ground level while breathing air.

NOTE: If Type 1 flight is used to fulfill training requirements for an Operational Support Instruction student, demonstrate the use of the high pressure oxygen system.
A2.3.9. Discuss the need for ventilating middle ears after flights using oxygen.
A2.3.10. Review flight and quiz trainees.

A2.4. Postflight Briefing. Review the chamber flight to emphasize learning outcomes. Give the trainees instructions to follow in case they experience any type of delayed reactions. Brief them on restrictions following chamber flights (paragraph 7.2).

TYPE 2 HYPOBARIC CHAMBER FLIGHT

A3.1. Type 2 Hypobaric Chamber Flight Goals. The Air Force designed this flight to give the trainees practical experience in and to confirm the effects of barometric pressure change, and reinforce to the novice flyer the principles and techniques learned in the Type 1 Chamber Flight. Overall objectives are listed in attachment 2. Additional objectives include:
A3.1.1. Practicing positive pressure breathing, at the maximum safe operating altitude of life support oxygen equipment.
A3.1.2. Experiencing and overcoming speech difficulties during Stage II pressure breathing.
A3.1.3. Using emergency and portable oxygen equipment and systems.
A3.1.4. Sustaining and enhancing aircrew member's confidence in their life support equipment.
A3.1.5. Enhancing trainees' confidence in their ability to effectively function throughout the entire flight envelope of most operational aircraft in the event of aircraft decompression.
A3.1.6. Confirming student symptoms of hypoxia experienced on the Type 1 chamber flight.

NOTE: Additional objectives may be included based on MAJCOM requirements.

A3.2. Preflight Briefing. Same as Type 1 Flight (paragraph A2.2).

A3.3. Simulated Flight in Low-Pressure Chamber Procedures (Time in Minutes--90 Minutes Total):
A3.3.1. During mask fitting, preflight check of oxygen equipment, and intercommunication check, have trainees don oxygen masks with regulator set at "100-percent oxygen."
A3.3.2. During ear check, ascend 5,000 feet and descend to ground level.
A3.3.3. Before beginning ascent to peak altitude, make sure that 30 minutes of denitrogenation have been completed.
A3.3.4. During ascent to 43,000 feet, discuss decompression phenomena using training aids to demonstrate mechanisms. Demonstrate and practice using oxygen regulators. Practice pressure breathing. Point out speech difficulties and the comparative degree of efficiency in performing flight tasks while pressure breathing at 43,000 feet.
A3.3.5. Make a rapid descent from 43,000 to 25,000 feet. At 25,000 feet, have all trainees experience symptoms of hypoxia simultaneously within limits of consciousness.
A3.3.6. Descend to 10,000 feet while demonstrating low pressure and high pressure emergency oxygen systems. Descend to ground level while breathing air.
A3.3.7. Discuss the need for ventilating middle ear after flights using oxygen. Discuss problems of rapid decompression.
A3.3.8. Review flight and quiz trainees.

A3.4. Postflight Briefing. Same as Type 1 Flight (paragraph A2.4).

TYPE 3 HYPOBARIC CHAMBER FLIGHT

A4.1. Type 3 Hypobaric Chamber Flight Goals. The Air Force designed this flight to acquaint trainees with the overall effects of barometric pressure change and to permit them to practice the principles and techniques learned in the classroom in the low-pressure flight environment. Specific training objectives include trainee experience in:
A4.1.1. The mechanical effects of pressure change (ear, sinus, and gas expansion problems).
A4.1.2. Positive pressure breathing resulting from the loss of cabin pressure in a low-pressure environment.
A4.1.3. Hypoxia recognition and treatment in self and others.
A4.1.4. Proper oxygen equipment discipline in a low-pressure environment.
A4.1.5. In-flight checks of oxygen equipment in a low-pressure environment.
A4.1.6. Use of the emergency oxygen system and portable oxygen equipment.
A4.1.7. Prevention, recognition, and treatment of hyperventilation during various flight conditions.
A4.1.8. Visual problems resulting from decreased oxygen during night flying conditions.
A4.1.9. Instilling and enhancing confidence in life support oxygen equipment.

NOTE: Additional objectives may be included based on MAJCOM, mission, or aircraft type requirement.

A4.2. Preflight Briefing. Same as Type 1 Flight (paragraph A2.2).

A4.3. Simulated Flight In Low-Pressure Chamber Procedures (Time in Minutes--90 Minutes Total):
A4.3.1. During mask fitting, preflight check of oxygen equipment, and intercommunication check, trainees don oxygen mask with regulator set at "100-percent oxygen."
A4.3.2. During ear check, ascend 5,000 feet and descend to ground level.
A4.3.3. Ensure that 30 minutes of denitrogenation have been completed before beginning ascent to peak altitude.
A4.3.4. During ascent to 35,000 feet, discuss decompression phenomena using training aids to demonstrate mechanisms. Demonstrate and practice using oxygen regulators. Practice pressure breathing.
A4.3.5. Make a rapid descent from 35,000 feet to 25,000 feet. At 25,000 feet, pair off trainees and have them alternately experience symptoms of hypoxia within limits of useful consciousness.
A4.3.6. During descent to 18,000 feet, have trainees remove masks at FL220 and experience mild hypoxia.
A4.3.7. At 18,000 feet, use visual test cards to demonstrate effect of hypoxia on night visual acuity.
A4.3.8. Descend to 10,000 feet while demonstrating low pressure and high pressure emergency oxygen systems.
A4.3.9. Discuss the need for ventilating middle ears after flights using oxygen. Discuss problems of rapid decompression.
A4.3.10. Review flight and quiz trainees.

A4.4. Postflight Briefing. Same as Type 1 Flight (paragraph A2.4).

TYPE 5 HYPOBARIC CHAMBER FLIGHT

A5.1. Type 5 Hypobaric Chamber Flight Goals. The Air Force designed this flight to acquaint HAP trainees with the overall effects of barometric pressure change and to permit them to practice the principles and techniques learned in the classroom in the low-pressure flight environment. Specific training objectives include trainee experience in:
A5.1.1. The mechanical effects of pressure change (ear, sinus, and gas expansion problems).
A5.1.2. Positive pressure breathing resulting from the loss of cabin pressure in a low-pressure environment.
A5.1.3. Applying the techniques and principles learned in the classroom to an accidental loss of cabin pressure.
A5.1.4. Recognition of the loss of cabin pressurization, factors affecting the severity of the decompression, the physical and physiological responses present, and the proper response to these occurrences.
A5.1.5. Hypoxia recognition and treatment in self and others during rapid decompression.
A5.1.6. Proper oxygen equipment discipline in a low-pressure environment.
A5.1.7. In-flight checks of oxygen equipment in a low-pressure environment.
A5.1.8. Use of the parachutists' oxygen equipment or portable oxygen equipment.
A5.1.9. Prevention, recognition, and treatment of hyperventilation during various flight conditions.
A5.1.10. Visual problems resulting from decreased oxygen during night flying conditions.
A5.1.11. Instilling, sustaining, and enhancing confidence in life support oxygen equipment.

NOTE: Additional objectives may be included based on MAJCOM, mission, or aircraft type requirements.

A5.2. Preflight Briefing. Same as Type 1 Flight (paragraph A2.2).

A5.3. Simulated Flight in Low-Pressure Chamber Procedures (Time in Minutes--60 Minutes Total):
A5.3.1. During mask fitting, preflight check of oxygen equipment and intercommunication check, trainees don oxygen mask with regulator set at "100-percent oxygen." HAP trainees may use their parachutist oxygen equipment if it is compatible with the chamber system and this flight profile.
A5.3.2. During ear check, ascend 5,000 feet and descend to ground level.
A5.3.3. Ensure that 30 minutes of denitrogenation have been completed before beginning ascent to peak altitude.
A5.3.4. During ascent to 35,000 feet, discuss decompression phenomena using training aids to demonstrate mechanisms. Demonstrate and practice using oxygen regulators. Practice pressure breathing.
A5.3.5. Trainees make a rapid descent from 35,000 feet to 30,000 feet. At 30,000 feet, demonstrate with a volunteer trainee the effects of acute hypoxia on muscular coordination, mental concentration, and so forth within the time of useful consciousness. After the demonstration at 30,000 feet, trainees activate their oxygen bottles and disconnect from the chamber oxygen supply. Trainees then descend from 30,000 feet to 15,000 at a free fall rate (10,000 to 12,000 feet per minute), then continue at a normal descent rate to 8,000 feet. At 8,000 feet, trainees reconnect to the chamber oxygen supply and turn off their oxygen bottles.
A5.3.6. At 8,000 feet, all trainees remove oxygen mask and a maximum ascent rate (open all knife and wheel valves) to 25,000 feet is begun. During ascent and subsequent time at 25,000 feet, trainees experience hypoxia within the limits of useful consciousness except for the HAP trainee who was used in the 30,000-foot demonstration. Resume oxygen and check all trainees.
A5.3.7. During descent to 18,000 feet, have trainees remove masks at FL220 and experience mild hypoxia.
A5.3.8. At 18,000 feet, use visual test cards to demonstrate effects of hypoxia on night visual acuity.
A5.3.9. Descend to 10,000 feet while practicing use of parachutists' oxygen equipment as available. Descend to ground level while breathing air.
A5.3.10. Practice using portable oxygen equipment as appropriate during the chamber flight. Discuss the need for ventilating middle ears after flights using oxygen. Discuss problems of rapid decompression.
A5.3.11. Review flight and quiz trainees.

A5.4. Postflight Briefing. Same as Type 1 Flight (paragraph A2.4).

TYPE 37 HYPOBARIC CHAMBER FLIGHT

A6.1. Type 37 Hypobaric Chamber Flight Goals. The Air Force designed this flight to reacquaint TARF, TTB and HELO refresher trainees with the overall effects of barometric pressure change and permit them to practice the principles and techniques learned in the classroom in the low-pressure flight environment. Specific training objectives include trainee experience in:

A6.1.1. The mechanical effects of pressure change (ear, sinus and gas expansion problems).

A6.1.2. Positive pressure breathing resulting from the loss of cabin pressure in a low-pressure environment.

A6.1.3. Applying the techniques and principles learned in the classroom to an accidental loss of cabin pressure.

A6.1.4. Recognition of the loss of cabin pressurization, factors affecting the severity of the decompression, the physical and physiological responses present, and the proper response to these occurrences.

A6.1.5. Hypoxia recognition and treatment in self and others during rapid decompression.

A6.1.6. Proper oxygen equipment discipline in a low-pressure environment.

A6.1.7. In-flight checks of oxygen equipment in a low-pressure environment.

A6.1.8. Use of the emergency oxygen system and portable oxygen equipment.

A6.1.9. Prevention, recognition, and treatment of hyperventilation during various flight conditions.

A6.1.10. Visual problems resulting from decreased oxygen during night flying conditions.

A6.1.11. Installing, sustaining, and enhancing confidence in life support oxygen equipment.

NOTE: You may include additional objectives based on MAJCOM, mission, or aircraft type requirements.

A6.2. Preflight Briefing. The instructor tells the trainees the purpose and procedures of the flight. The chamber flight, including prebreathing, should not exceed 1 hour. You should use all the chamber time for training activities. Use one hundred percent oxygen up to 8,000 feet where the masks are removed for the rapid ascent to 25,000 feet and the hypoxia demonstration. The instructor explains why, in pressurized aircraft, the oxygen is regulated with the setting on “normal” unless conditions of the flight dictate the use of 100-percent oxygen.

A6.3. Simulated Flight in Low-Pressure Chamber Procedures (Time in Minutes-60 Minutes Total):

A6.3.1. During mask fitting, preflight check of oxygen equipment, and intercommunication check, have trainees don oxygen masks with regulator set at “100-percent oxygen.”

A6.3.2. Ascent and descent rates are as follows: ear check at 2,500 feet per minute; ascent to 8,000 feet at 5,000 feet per minute; 8,000 feet to 25,000 feet at maximum vacuum, descent from 25,000 feet to 18,000 feet at 5,000 feet per minute; descent from 18,000 feet to ground level at 2,500 feet per minute.

A6.3.3. During ear check, ascend to 5,000 feet above ground level and return.

A6.3.4. Ensure that 30 minutes of denitrogenation have been completed before reaching 8,000 feet in preparation for the hypoxia demonstration. During pre-breathing period have TARF and TTB trainees experience pressure breathing by using the narrow panel regulator in the EMERGENCY and the TEST MASK positions or the A-14 oxygen regulators when available.

A6.3.5. During ascent to 8,000 feet and on to 25,000 feet discuss decompression phenomena using training aids to demonstrate mechanisms. Demonstrate and practice using the oxygen regulators.

A6.3.6. At 8,000 feet the TTB trainees desiring to use a quick don oxygen mask system will make the transition to this system if available.

A6.3.7. After the oxygen systems have been switched, and the communication with the trainees is rechecked, all trainees will drop their masks as the chamber is taken at maximum vacuum to 25,000 feet. During ascent and subsequent time at 25,000 feet, trainees experience hypoxia within the limits of useful consciousness. Trainees resume breathing oxygen and are confirmed to be fully recovered before starting descent.

A6.3.8. HAP refresher students may be given the following variation in chamber exposure after the 25,000 feet hypoxia demonstration: trainees activate their oxygen bottles and disconnect from the chamber oxygen supply; HAP trainees then descend from 25,000 feet to 15,000 ft at a free fall rate (10,000 feet per minute); level at 15,000 feet; reconnect to the chamber oxygen supply and turn off their oxygen bottles; remove their oxygen masks and ascend to 18,000 feet to experience mild hypoxia at 18,000 feet to demonstrate effects of hypoxia on night vision; resume normal type 37 chamber flight with descent to ground level.

A6.3.9. During descent to 18,000 feet, have trainees remove masks at FL220 and experience mild hypoxia.

A6.3.10. At 18,000 feet, use visual aids to demonstrate effects of hypoxia on night visual acuity.

A6.3.11. Descend to 10,000 feet while breathing normal oxygen. After descent below 10,000 feet, oxygen masks may be disconnected and descent continued to ground level breathing air.

A6.3.12. Practice using emergency and/or portable oxygen equipment as appropriate during the chamber flight. If pressure breathing was not demonstrated earlier, use portable oxygen equipment to practice breathing techniques using higher breathing pressures and review walk-around cylinder recharging. Discuss the need for ventilating middle ears after flights using oxygen. Discuss problems of rapid decompression.
A6.3.13. Review flight and answer questions.

A6.4. Postflight Briefing. Same as Type 1 Flight (paragraph A2.4).